

Alimentation de LNAs par Bias-Tee intégré dans les dongles RTL-SDR.com

Certains dongles, comme ceux de RTL-SDR.com offrent la possibilité de télé-alimenter un LNA ou une antenne active avec LNA intégré, évitant ainsi l'installation d'un Bias-Tee entre les deux modules.

Cependant l'activation de cette alimentation n'était pas très souple dans la mesure où il fallait, à chaque utilisation, ouvrir une invite de commandes et taper deux lignes de commandes, comme indiqué dans l'extrait du RTL-SDR Blog V.3. Dongles User Guide reproduit ci-dessous.

Récemment RTL-SDR vient de sortir une dll modifiée qui remplace la **rtlsdr.dll** dans le dossier du programme **SDR#**. La case «Tuning offset», inutilisée jusqu'à présent dans le menu « Configurer source » (roue dentée), est à cocher pour activer la télé-alimentation.

L'ayant essayée, cette modification fonctionne parfaitement et reste mémorisée même après l'arrêt du programme. Ce qui peut aussi être un piège dans certains cas si on rebranche une antenne court-circuitant la tension continue.

Je ne pense pas que cette option fonctionne sur d'autres types de dongles. Cela ne fonctionne pas, par exemple, avec les clés RTL2832 noires ou bleues de grande diffusion car elles ne contiennent pas de Bias-Tee intégré.

Elle ne fonctionne pas non plus avec les clés proposées par Outernet utilisant le circuit Elonics E4000, qui elles possèdent un Bias-Tee intégré, mais non commutable et donc activé en permanence. Quand aux récepteurs de type RSP 1& 2 et leurs clones, ainsi que les dongles utilisant le chip set Mirics, ils sont contrôlés par le logiciel SDR-Uno qui ne possède pas cette fonction, tout au moins actuellement.

Reste donc à vérifier au cas par cas.

Profitant de cette occasion, j'ai rassemblé d'autres infos qui touchent de près ou de loin le sujet du Bias-Tee intégré des dongles RTL-SDR, ainsi que les modifications apportées au fil du temps.

Patrick F6AZZ

F6AZZ Décembre 2019 V1

Les dernières news :

[In Testing : Customized Drivers for RTL-SDR Blog V3 SDRs](https://www.rtl-sdr.com/?s=in+testing)

<https://www.rtl-sdr.com/?s=in+testing>

November 1, 2019

We've recently released a [modified version of the Osmocom RTL-SDR drivers that has a few enhancements particularly for RTL-SDR Blog V3 units](#). The changes merge improvements to L-Band PLL locking performance which may be necessary for operating units in high ambient heat environments and the RTL_TCP performance enhancements by Stephen Blinick.

If you want to toggle the bias tee ON/OFF in SDR#, we've also made use of the "Offset Tuning" checkbox in the RTL-SDR settings. This checkbox is unused for R820T2 RTL-SDRs, so we've added code that will toggle the bias tee ON/OFF with this checkbox.

In addition we've also made use of some unused EEPROM flags to create a method that allows you to force the bias tee to be always ON if a certain EEPROM flag is set. You can also force direct sampling mode with another EEPROM flag. Note that these force flags will only work if you are using these drivers.

A Windows release is available on the [Github Releases](#). To use with SDR#, simply replace the rtl_sdr.dll file in the SDR# folder with the one in the Release.zip file. To install on Linux, follow the instructions in the Readme, and remember to follow the instructions to remove librtlsdr-dev if you previously installed drivers via the package manager.

If there are any problems or feedback, please open an issue on GitHub.

List of changes shown below.

1) VCO PLL current fix - Improves stability at frequencies above ~1.5 GHz
<https://www.rtl-sdr.com/beta-testing-a-modified-rtl-sdr-driver-for-l-band-heat-issues/>

2) RTL_TCP ring buffer enhancement by Stephen Blinick
<https://www.rtl-sdr.com/significantly-improving-rtl-tcps-performance-with-ring-buffers/>

3) Enabled direct sampling for rtl_tcp

4) rtl_biast program added, including the ability to turn on/off any GPIO

5) Hack to force the bias tee to always be on by setting the unused IR endpoint bit to 0 in the EEPROM. Example to force the BT to be always ON "rtl_eeprom -b y", to remove forced BT "rtl_eeprom -b n"

6) Hack to force direct sampling to be always on by setting the unused remote-enabled bit to 1 in the EEPROM. Example to force direct sampling always "rtl_eeprom -q y". To remove forced direct sampling "rtl_eeprom -q n"

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7) Repurposed "offset tuning" to toggle bias tee ON/OFF. We can now use the "offset tuning" button in SDR# and other programs to toggle the bias tee if there is no specific button in the GUI.

Extraits du User Guide :

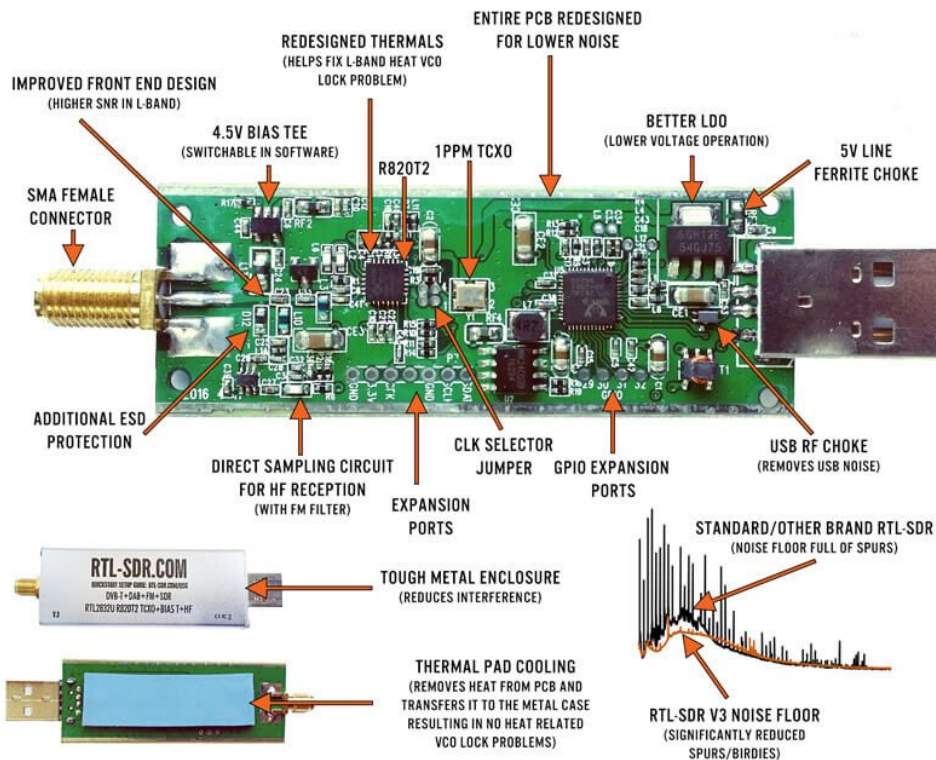
RTL-SDR Blog V.3. Dongles User Guide

<https://www.rtl-sdr.com/rtl-sdr-blog-v-3-dongles-user-guide/>

At RTL-SDR.com we sell significantly improved premium RTL-SDR dongles but keep the prices low and with free shipping. We strongly believe that our V3 dongles are currently the best 'bang for your buck' RTL-SDR dongles available on the market. Please see the V3 features pdf datasheet [here](#) for full information on the improvements made, and our [V3 users guide](#) for information on using special features of our dongle. If you are new to RTL-SDR check out our [about page](#) first. Briefly, our dongles come with the following improvements:

4.5V USB powered bias tee - This allows the RTL-SDR to power low noise amplifiers (like the LNA4ALL, HABAMP, RTL-SDR Blog ADS-B LNA) and active antennas through the coax cable. Can be enabled in software ([see V3 users guide](#)).

WHAT MAKES OUR RTL-SDR V3 BETTER THAN OTHERS?



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Feature 2: Software Selectable Bias Tee

V.1. and V.2. of our dongles included a bias tee which could manually be enabled by opening the case and soldering two pads on the PCB together. V.3. introduces a 4.5V bias tee that can be toggled entirely in software. The bias tee can continuously pull up to 180 mA of current.

WARNING: Before using the bias tee please ensure that you understand that you should not use this option when the dongle is connected directly to a DC short circuited antenna unless you are using an LNA. Although the bias tee circuit is dual protected against accidental shorts with a thermal self-resetting fuse and overcurrent protection on the LDO, short circuiting the bias tee for an extended period of time (days) could damage the LDO or fuse permanently. Only use it while connected to an actual powered device, like an LNA, active antenna or the SpyVerter.

To make things clearer:

DC Short Antenna -> LNA -> Coax -> V3 (bias tee on) is absolutely fine.

What's not good and makes no sense anyway is DC Short Antenna -> Coax -> V3 (bias tee on).

DC Short Antenna -> Coax -> V3 (bias tee off) is fine.

Note that the legacy DVB-T TV drivers will activate the bias tee by default. On Linux ensure that you have properly blacklisted the DVB-T drivers. More info on how to blacklist on the Linux section on the [quickstart guide](#).

Optional Video: Bias tee tutorial by SignalsEverywhere [available here](#).

To enable the bias tee in Windows:

1. Download and extract all the files in [this zip file](#) to a folder on your PC. **It contains two batch files that can be run.**
2. Make sure all SDR software like SDR# / HDSDR / SDR-Console etc is fully losed.
3. **Run the biastee_on.bat file to turn the bias tee on.** It will run and open a CMD prompt that will briefly say "Found Rafael Micro R820T Tuner". The CMD prompt will close soon after upon success.
4. The bias tee is now on. **To turn it off repeat steps 2 & 3, but instead run the biastee_off.bat batch file. Alternatively, simply disconnect and then reconnect the SDR to turn the bias tee off.**

If you have multiple dongles connected you'll need to edit the batch file to specify what dongle's bias tee you want to activate. Open the bat file with any text editor, like Notepad, and add the dongle selector "-d" flag. For example to activate the bias tee on the dongle that was plugged in second you'd need to change it to "rtl_biast -b 1 -d 1".

If you get a Smart Screen message, click on More Info, and then on Run Anyway. Also note that some versions of Windows may fail to run batch files due to misconfiguration or aggressive antivirus software. If you cannot fix these problems with Windows or your antivirus, run the command manually on the CMD line.

To run it manually on the CMD line first browse to the directory where the bias tee software is stored using "cd" (e.g. cd C:\SDR\bias_tee_folder), and then run:

1. **ON: rtl_biast -b 1**
2. **OFF: rtl_biast -b 0**
3. **If needed select a particular RTL-SDR device with the -d flag.**

To enable the bias tee in Linux:

In Linux or MacOS download the source from git, compile it the same way you do the regular RTL-SDR drivers, and then run `./rtl_biast -b 1` to turn the bias tee on and `./rtl_biast -b 0` to turn the bias tee off. The procedure is:

```
git clone https://github.com/rtl-sdrblog/rtl-sdr-blog
cd rtl-sdr-blog
mkdir build
cd build
cmake ..
make
cd src
./rtl_biast -b 1
```

If you want to be able to run the bias tee program from anywhere on the command line you can also run "sudo make install".

If you have trouble running the bias tee check with a multimeter if there is 4.5V at the SMA port. Also check that your powered device is actually capable of receiving power. Remember that not all LNA's can accept bias tee power. We recommend Adam 9A4QV's [LNA4ALL](#), as you can order this from his store with the bias tee power option enabled. If you need further help please contact us at admin@rtl-sdr.com.

Enabling the Bias Tee in PiAware

Please see [this link](#) for instructions, or see below to see how to force the bias tee to be always on.

Forcing the Bias Tee to be Always On

If you are using our [RTL-SDR-Blog driver branch](#) you can force the bias tee to be always on by setting a flag in the EEPROM. The rtl_eeprom command is "rtl_eeprom -b y". Run the opposite command "rtl_eeprom -b n" to disable the forced bias tee.

Current Known Issues:

We're constantly trying to improve our units and we always make note of what issues exist and how to fix them.

2019 Onwards:

No known issues.

2019 and earlier units:

Note that this problem has been fixed in newer batches with a new design.

0.2 - 0.3% of units may have a faulty RTL2832U chip. This is characterized by higher than normal USB currents (normal is 0.28A - 0.3A), and often random disconnections from the USB as well as increased heat. The same problem affects all brands of RTL-SDR.

2018/8 Batch:

A small number of these units (~approx 300 units) had faulty bias tee LDO chips which caused the bias tee to be permanently on. The cause was bad silicon in the LDO chip. These units run fine in all other ways, except that the bias tee cannot be turned off. They can continue to be used normally, without the bias tee. The thermal fuse will protect against short circuits.

If you have one of these, feel free to contact us at admin@rtl-sdr.com for a replacement, or if the bias tee is not important to you and you can solder, removing the L13 inductor will fully disable the bias tee.

Known V3 Batch 1 Issues (*limited quantity batch, no longer shipping*):

1. *Increased sideband noise on very strong narrowband signals.* This should not be a significant problem as it only affects very strong signals. The hardware fix is to add about 100-220uF of capacitance on the 3.3V power line. Batch 2 will reduce this noise.
2. ***The bias tee when turned on adds a large spur in direct sampling HF mode. This may be problematic only if you intend to use a bias tee powered HF LNA in direct sampling mode. This can be fixed by adding about 2.2uF of capacitance to the output of the LDO, before the inductor. Batch 2 will fix this.***

3. **The bias tee can be damaged by accidentally short circuiting the output for a few seconds while it is on. This damage only occurs on USB3.0 and USB2.0 ports that can provide up to 1A or more or current. Batch 2 will add a resettable fuse to prevent damage.**

LF Improvement / Bias Tee Disable Mod:

If you want to improve the performance at LF and do not require the bias tee, then you can remove the bias tee inductor at L13. Of course remember that if you are interested in VLF/LF, it might be a better idea to use an upconverter like the SpyVerter, which can be powered by the bias tee on the dongle.

